

MEMORANDUM TO MEMBERS OF THE NATIONAL SCIENCE BOARD

SUBJECT: Summary Report of the March 29-30, 2005 Meeting

The major actions of the National Science Board (NSB, the Board) at its 385th meeting on March 29-30, 2005 and a preliminary summary of the proceedings are provided below. This memorandum will be publicly available for any interested parties to review. A more comprehensive set of NSB meeting minutes will be posted on the Board's public Web site (<http://www.nsf.gov/nsb/>) following Board approval at the March 2005 meeting.

1. Major Actions of the Board (not in rank order of importance)

- a. The Board approved the minutes of the Plenary Open Session (NSB-05-17) for the February 2005 meeting of the NSB (http://www.nsf.gov/nsb/meetings/2005/0205/open_min_feb05.pdf). Minutes for the Plenary Executive Closed and Closed Sessions for the February 2005 meeting of the NSB were also approved.
- b. The Board approved a resolution to close portions of the upcoming May 25-26, 2005 NSB meeting on staff appointments, future budgets, pending proposals/awards for specific grants, contracts, or other arrangements, and those portions dealing with specific Office of the Inspector General investigations and enforcement actions, or agency audit guidelines (NSB-05-21) (Attachment 1).
- c. The Board approved recipients for the 2005 Alan T. Waterman Award, Vannevar Bush Award, and the NSB Public Service Awards. The Alan T. Waterman Award: Dr. Dalton Conley, Professor of Sociology and Public Policy and Director, Center for Advanced Social Sciences Research, New York University. Vannevar Bush Award: Mr. Robert W. Galvin, Chairman and CEO (Retired), Motorola Inc. NSB Public Service Award – Individual: Mr. Ira Flatow, Host and Executive Producer of “Talk of the Nation: Science Friday.” NSB Public Service Award – Group: Computing Research Association’s Committee on the Status of Women in Computing Research.
- d. The Board approved a resolution that authorized the Director, at his discretion, to renew the cooperative agreement with Cornell University to manage and operate the National Astronomy and Ionosphere Center (NAIC) from April 1, 2005 to March 31, 2010. Funding beyond the first 18 months will be determined at a later date and submitted for Board approval.

- e. The Board approved a resolution that authorized the Deputy Director, at his discretion, to make an award to the University of Chicago for the project *ETF Grid Infrastructure Group: Providing System Management and Integration for the TeraGrid* for 60 months. Funding beyond year two is contingent on a Board-approved NSF strategy for high performance computing that describes how NSF centers will cooperate, and how each will inter-operate and relate to the existing and emerging NSF and national investments in cyberinfrastructure.
- f. The Board approved a resolution that authorized the Deputy Director, at his discretion, to make an award to Carnegie Mellon University and the University of Pittsburgh through MPC Corporation for Pittsburgh Supercomputing Center for *TeraGrid Resource Partners* for 60 months. Funding beyond year two is contingent on a Board-approved NSF strategy for high performance computing that describes how NSF centers will cooperate, and how each will inter-operate and relate to the existing and emerging NSF and national investments in cyberinfrastructure.
- g. The Board approved the release, for public comment, of the draft report of the National Science Board, *Long-lived Digital Data Collections: Enabling Research and Education in the 21st Century* (NSB-05-40). (http://www.nsf.gov/nsb/meetings/2005/LLDDC_Comments.pdf).
- h. The Board approved a charge to the Committee on Education and Human Resources for a “Workshop on Engineering Workforce Issues and Engineering Education: What are the Linkages?” (NSB-05-41) (Attachment 2).
- i. The Board approved the establishment of an *ad hoc* Task Group on “Vision for NSF Science and Engineering Research and Education” (NSB-05-42) (Attachment 3). Dr. Delores Etter will chair the Task Group, with members Drs. Barry Barish, Douglas Randall, and Kathryn Sullivan. The task group will report directly to the full Board and will consult closely with the four standing committees. The NSB Chairman, NSB Vice-Chair, NSB Committee on Strategy and Budget chairman, and NSB Executive Committee chairman will serve as *ex officio* members of the *ad hoc* task group.

2. NSB Chairman’s Report

Dr. Diana Natalicio reported on behalf of Dr. Warren Washington, Chairman.

The Board publicly released the report, *Broadening Participation in Science and Engineering Faculty* at the American Association for the Advancement of Science (AAAS) annual meeting on February 19th. Dr. Washington and Dr. Michael Crosby, NSB Executive Officer, gave a panel presentation on the report during a special session at AAAS. Copies of the report have been sent to Congress, Federal agencies, professional societies, presidents of research universities, and the NSF advisory committees.

Dr. Washington had established the *ad hoc* NSB Election Committee (also known as the Committee on Nominating for NSB Elections). Dr. Daniel Hastings is the chairman. Members of the committee are: Drs. Kenneth Ford, Michael Rossmann, and Jo Anne Vasquez. Two vacancies will occur on the Executive Committee in May of this year as the terms for Drs. Barry Barish and Delores Etter end. The committee will prepare a slate of candidates for consideration and election at the May 2005 meeting.

The Board had several actions to address stemming from the congressional report language for the FY 2005 NSF budget, discussions among Board Members at the annual Retreat in February, and the series of Senate and House hearings in February and March during which the Board provided testimony and engaged in dialog with Members of Congress. [Most of these actions had been assigned to NSB committees and described in the committee sections of this report.]

The Senate requested that the National Science Board exercise its' legislated authority and responsibility by developing and establishing a new vision for the National Science Foundation for the 21st century. The Board concurred that an *ad hoc* task group would take the lead for conceptualizing and drafting an initial document to be finalized and approved by the full Board by the end of 2005. The *ad hoc* task group would be chaired by Dr. Etter with task group members Drs. Barry Barish, Douglas Randall, and Kathryn Sullivan. The NSB Chair, NSB Vice-Chair, NSB Committee on Strategy and Budget (CSB) chair and NSB Executive Committee chair would all serve in an *ex officio* capacity on this *ad hoc* task group, participating and providing comments to the degree that they are able. This task group would report directly to the full Board, consult closely with CSB and receive input from all NSB committees. Through the Executive Committee chair, NSF management would be able to provide input and comment as the vision document is developed by the Board. [*The full Board subsequently approved the establishment of an ad hoc Task Group on "Vision for NSF Science and Engineering Research and Education."*] (Attachment 3)

The vision document will build on the 1998 NSB *Strategic Plan*, the *NSF Strategic Plan FY 2003-2008*, and the Board's 2003 report to Congress in response to Section 22 of the 2003 NSF Appropriations Act. The final document will contain the following: long-term vision and goals for NSF in the 21st Century, clear statement of NSB role and responsibilities, characterization of the near-term Federal budget environment and related constraints on Federal investment in science and engineering research and education, and long- and short-term priorities that take into account Federal fiscal realities. Each NSB standing committee was asked, and accepted, the responsibility of developing specific elements of the vision document.

3. NSF Director's Report

Dr. Arden Bement, NSF Director, reported on new NSF staff positions and congressional items.

Dr. Bement announced the following new NSF staff positions: Dr. David Lightfoot, Assistant Director, Directorate for Social, Behavioral, and Economic Science; Dr. Wei Zhao, Director, Division of Computer and Network Systems, Directorate for Computer and Information Science and Engineering; Dr. Michael Van Woert, Executive Officer, Office of Polar Programs, Office of the Director; and Dr. Susan Lolle, visiting Program Director, Directorate for Biological Sciences.

After the restructuring of both the House and Senate Appropriations Committees, the NSF would be under new Congressional jurisdiction. In early February, the House Appropriations Committee reduced its number of subcommittees from 13 to 10. This streamlining dissolved the VA, HUD, and Independent Agencies Subcommittee. This revamp placed the NSF, National Aeronautics and Space Administration (NASA), and Office of Science and Technology Policy (OSTP) under the jurisdiction of the newly formed Science, State, Justice, and Commerce Subcommittee. In early March, the Senate Appropriations Committee followed suit with its own version of restructuring. The Senate reduced its number of subcommittees from 13 to 12. Again, the VA, HUD, and Independent Agencies Subcommittee was dissolved. The Commerce, Justice and Science Appropriations Subcommittee absorbed NSF, NASA, and OSTP.

Dr. Bement reported that he made four appearances before Congress regarding the FY 2006 budget request: February 16, the House Science Committee heard from OSTP, NASA, the Department of Energy, and the NSF; February 17, the last official hearing of the Senate VA, HUD and Independent Agencies Appropriations Subcommittee; March 9, back to the House side, along with Dr. Mark Wrighton and Dr. Christine Boesz, NSF Inspector General, before the Research Subcommittee of the House Science Committee; and March 11, the newly reconstituted House Science, State, Commerce, and Justice Appropriations Subcommittee heard testimony from OSTP Director, Dr. John Marburger, Dr. Ray Bowen representing the Board, and the NSF Director.

For the 109th Congress to date, 23 pieces of legislation were introduced that particularly mentioned NSF. These ranged in scope from those calling for consultation or committee involvement to the authorization on new research programs. Since the last NSB meeting, 10 bills were introduced relevant to NSF. The most notable included: H.R. 759 and S. 142: the Climate Stewardship Act of 2005, which expanded Federal climate change research initiatives. H.R.1215: Green Chemistry Research and Development Act of 2005, which authorized, on average, \$7.5 million above and beyond NSF's current levels of spending over the next 3 years on green chemistry research and education programs. S. 432: Minority Serving Institution Digital and Wireless Technology Opportunity Act of 2005, which required NSF to spend \$1.25 billion in digital and wireless infrastructure at minority serving institutions.

Of the other introduced bills, only one was reported out of committee. On March 17, the House Science Committee reported out on H.R. 29: High-Performance Computing Revitalization Act of 2005, which authorized NSF to support high-performance computing and networking research, provide information technology infrastructure for the U.S. research community, and support basic high-performance computing and networking research and education.

4. NSB Committee Reports

a. Audit and Oversight (A&O) Committee

In response to Dr. Natalicio's request to contribute to development of the vision document, Dr. Mark Wrighton, A&O chairman, on behalf of the committee, accepted responsibility to develop a strong and clear statement on the roles and responsibilities of the Board for the vision document requested by Congress. The committee also agreed to: (a) ensure timely NSF implementation of corrective plans to respond to recent audit findings, and (b) examine the NSF merit review system.

Mr. Thomas Cooley, NSF Chief Financial Officer, provided an update on the resolution of the reportable conditions on post-award monitoring in the FY 2004 Financial Statements Audit. He pointed out that NSF's goal is not simply to address the reportable conditions, but to ensure that NSF's post-award monitoring achieves the same "gold standard" recognition for which NSF's pre-award merit review process is noted. Mr. Felipe Alonso, KPMG auditor, explained that corrective actions proposed by NSF to resolve the two reportable conditions must include: (1) a specific deliverable in response to the recommendation, and (2) an expected target date for its completion.

Mr. Cooley discussed NSF's responses to the FY 2004 audit's Management Letter and efforts to meet the requirements of Office of Management and Budget's December 2004 update to Circular A-123 "Management's Responsibility for Internal Control," the Federal government version of Sarbanes-Oxley. Mr. Joel Grover, OIG, reviewed for the committee the contracting process for the financial statement audit, which is up for re-competition.

In response to a House Appropriations Committee request to examine the NSF merit review system, Dr. Wrighton asked Dr. Crosby to prepare an action plan for a structured review of the NSF system of merit review. Dr. Crosby described the plan, which was endorsed by A&O. The NSB Office would prepare a draft report outline for A&O review at the May meeting, with a draft report to be prepared for provisional Board approval by the end of summer 2005. The A&O Committee was particularly interested in identifying ways to obtain substantive community input. Dr. Crosby noted and A&O concurred that the NSF 2004 merit review report and aspects of the NSF business analysis activities would provide significant supplemental information for the NSB review activities.

Two reports were provided by NSF staff relating to merit review. Dr. Fae Korsmo, Staff Associate, Office of Integrative Activities, highlighted the *Report to the National Science Board on the National Science Foundation's Merit Review Process (NSB-05-12)* (http://www.nsf.gov/nsb/documents/2005/MRreport_2004.pdf). Mr. Joseph Burt, Division Director, Division of Human Resource Management, provided an update on those NSF business analysis activities related to merit review, including the results of an FY 2003 survey of grant applicants.

In closed session, the OIG presented information about several ongoing investigations.

b. Committee on Programs and Plans (CPP)

In response to Dr. Natalicio's request to contribute to development of the vision document, Dr. Daniel Simberloff, CPP chairman, on behalf of the CPP committee, accepted responsibility to develop over-arching goals for the future of science and engineering (S&E), including the next bold cutting-edge areas of research. CPP will also provide input regarding long- and near-term NSF S&E program priorities.

The committee also agreed to: (a) review NSB policy regarding size and duration of awards, (b) update of the Board's 2001 report on the role of U.S. Government in international S&E, and (c) examine appropriate program portfolio balance of NSF centers versus smaller individual principle investigator (PI) grants.

Dr. Michael Rossmann provided an update draft report from the Long-Lived Digital Data Collections Working Group. Suggested revisions were discussed; the committee approved a recommendation to forward the report to the full NSB for approval to release the report for public comment. *[The full Board subsequently approved releasing the draft report for public comments.]* Comments will be incorporated into the report by CPP and a final report will be reviewed at the May NSB meeting.

Dr. Simberloff invited Dr. Crosby to provide an overview of the public comments received on the joint NSB/NSF response on the draft report, *Setting Priorities for Large Facilities Projects Supported by the National Science Foundation (NSB/CPP-04-20)*. CPP will incorporate comments into a revised report and submit it to NSB for approval at the May meeting. The report will then be on schedule to be implemented by NSF in the fall as part of the full revised large facilities process.

Dr. Simberloff led a discussion on the draft *NSF Facility Plan* noting that significant improvements have been made to the report since the last meeting but some minor editorial issues remain. Dr. Bordogna, NSF Deputy Director, noted that the Facilities Plan needs to be completed by the fall. Dr. Simberloff suggested that Dr. Bordogna and Dr. Crosby work together to ensure the Board receives the revised report 2 weeks prior to the next meeting.

Dr. Bordogna made a presentation to CPP on the annual NSF Major Research Equipment and Facilities Construction (MREFC) review process, and presented a timeline of critical dates. The Board concurred that they felt comfortable with this plan for major facilities review.

Dr. Michael Turner, Assistant Director, Directorate for Mathematics and Physical Sciences, provided an informational update on the Rare Symmetry Violating Processes (RSVP), noting that NSF will bring a recommendation to NSB in September 2005.

In closed session, three action items and two information items were discussed.

c. CPP Subcommittee on Polar Issues (SOPI)

Dr. John White, SOPI chairman, invited staff from NSF's Office of Polar Programs to give presentations on several activities: planning for the International Polar Year 2007-2008; highlights of the recent Antarctic season; a summary of projects that integrate arctic research and education; and construction of the Ice Cube Neutrino Observatory at South Pole.

In closed session, SOPI discussed future budget implications of the transfer of icebreaker operations and maintenance funding from the U.S. Coast Guard to NSF.

d. CPP Task Force on Transformative Research (TR)

Dr. Nina Fedoroff, TR chair, led a discussion on the implementation of task force actions to address the charter objectives. The committee agreed that the first activity should be an internal workshop with NSF senior staff, tentatively scheduled for August 2005. One or two subsequent workshops would involve participants from outside NSF.

Dr. Fedoroff invited suggestions from TR members for potential workshop participants, and stated that she would work with NSF's TR liaisons to determine future workshop topics and dates.

Dr. Arthur Ellis, Division Director of Chemistry, Directorate for Mathematical and Physical Sciences, and Dr. Maria Zemankova, Program Director, Division of Information and Intelligent Systems, Directorate for Computer and Information S&E gave presentations that illustrated programmatic and analytical aspects of transformative research.

e. Committee on Strategy and Budget (CSB)

In response to Dr. Natalicio's request to contribute to development of the vision document, Dr. Ray Bowen, CSB chairman, on behalf of the CSB committee, accepted responsibility to use the 2003 Section 22 report (*Fulfilling the Promise: A Report to Congress on the Budgetary and Programmatic Expansion of the National Science Foundation*, [NSB-03-151](#), in response to Section 22 of the NSF Authorization Act of 2002), as a starting point for developing broad goals for NSF in the 21st century, along with near and long-term budget priorities taking into consideration Federal budget realities.

The committee also agreed to: (a) review NSB policy regarding size and duration of awards, and (b) examine the appropriate financial portfolio balance of NSF centers versus smaller individual PI grants. The portfolio examination will include a determination of metrics for grant productivity that could be used to assess scientific returns and guide the most effective use of limited funds.

Dr. Bement provided an informative briefing of the FY 2007 NSF budget process, with particular emphasis on necessary NSB action items over the coming year. In addition, he identified several important considerations in formulating FY 2007 budget priorities.

f. Executive Committee (EC)

In closed session, the executive committee voted to bring a Member proposal before the Board for approval. *[The full Board subsequently approved the Member proposal in the Plenary Executive Closed Session.]* Dr. Bement, EC chairman, informed members on the status of several executive staff searches and budget issues.

g. Education and Human Resources (EHR) Committee

In response to Dr. Natalicio's request to contribute to development of the vision document, Dr. Elizabeth Hoffman, EHR chair, on behalf of the EHR Committee, accepted responsibility to develop over-arching goals for the future of S&E education, including input regarding long- and near-term NSF education program priorities.

The committee also agreed to contribute to evaluation of existing pre-college math and science education in the U.S. Dr. Hoffman asked Dr. Donald Thompson, Acting Assistant Director, Directorate of Education and Human Resources, to provide the committee with a statistical summary of the impacts of the programs that involve broadening participation at the undergraduate, graduate, and post-doctoral levels.

Dr. Hoffman asked that Dr. Sullivan report to the EHR Committee at the May meeting on long-range national aspirations in S&E education. Dr. Hoffman also asked that portions of a memo, which was submitted by Dr. Vasquez, be incorporated into the response to the March 29, 2005 letter from Congressman Vernon Ehlers to the NSB.

The committee approved transmittal of the draft "Charge for a Workshop on Engineering Workforce Issues and Engineering Education: What are the Linkages?" (NSB-05-41) (Attachment 2) to the full Board. *[The full Board subsequently approved the charge for the workshop.]*

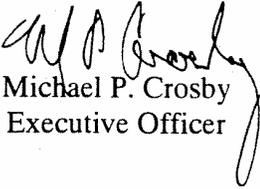
Dr. Daryl Chubin and Dr. Shirley Malcom from AAAS made a presentation on the new AAAS guidebook, *Standing Our Ground: A Guidebook for STEM Educators in the Post-Michigan Era*.

h. EHR Subcommittee on Science and Engineering Indicators (SEI)

The Subcommittee reviewed two draft chapters for *Science and Engineering Indicators 2006*: "Elementary and Secondary Education" and "State Indicators." Members agreed that once the changes identified during the meeting were incorporated, and the chapters were professionally edited, they could be included in the final draft comprising all chapters.

i. *ad hoc* Committee for the Vannevar Bush Award

The Vannevar Bush Award Committee selected a candidate for the 2005 award to recommend to the NSB during the Plenary Executive Closed Session on Wednesday, March 30.


Michael P. Crosby
Executive Officer

Attachment 1: NSB-05-21

Attachment 2: NSB-05-41

Attachment 3: NSB-05-42

National Science Board

NSB-05-21
February 28, 2005

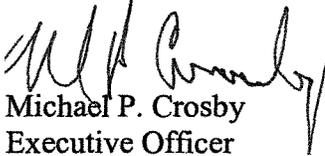
MEMORANDUM TO MEMBERS OF THE NATIONAL SCIENCE BOARD

SUBJECT: Closed Session Agenda Items for May 25-26, 2005 Meeting

The Government in the Sunshine Act requires formal action on closing portions of each Board meeting. The following are the closed session agenda items anticipated for the May 25-26, 2005 meeting.

1. Staff appointments
2. Future budgets
3. Grants and contracts
4. Specific Office of Inspector General investigations and enforcement actions

A proposed resolution and the General Counsel's certification for closing these portions of the meetings are attached for your consideration.


Michael P. Crosby
Executive Officer

Attachments

PROPOSED
RESOLUTION
TO CLOSE PORTIONS OF
386th MEETING
NATIONAL SCIENCE BOARD

RESOLVED: That the following portions of the meeting of the National Science Board (NSB) scheduled for May 25-26, 2005 shall be closed to the public.

1. Those portions having to do with discussions regarding nominees for appointments as National Science Board members and National Science Foundation (NSF) staff appointments, or with specific staffing or personnel issues involving identifiable individuals. An open meeting on these subjects would be likely to constitute a clearly unwarranted invasion of personal privacy.
2. Those portions having to do with future budgets not yet submitted by the President to the Congress.
3. Those portions having to do with proposals and awards for specific grants, contracts, or other arrangements. An open meeting on those portions would be likely to disclose personal information and constitute a clearly unwarranted invasion of privacy. It would also be likely to disclose research plans and other related information that are trade secrets, and commercial or financial information obtained from a person that are privileged or confidential. An open meeting would also prematurely disclose the position of the NSF on the proposals in question before final negotiations and any determination by the Director to make the awards and so would be likely to frustrate significantly the implementation of the proposed Foundation action.
4. Those portions having to do with specific Office of the Inspector General investigations and enforcement actions, or agency audit guidelines.

The Board finds that any public interest in an open discussion of these items is outweighed by protection of the interests asserted for closing the items.

CERTIFICATE

It is my opinion that portions of the meeting of the National Science Board (NSB) or its subdivisions scheduled for May 25-26, 2005 having to do with nominees for appointments as NSB members and National Science Foundation (NSF) staff, or with specific staffing or personnel issues or actions, may properly be closed to the public under 5 U.S.C. § 552b(c) (2) and (6); those portions having to do with future budgets may properly be closed to the public under 5 U.S.C. § 552b(c) (3) and 42 U.S.C. 1863(k); those portions having to do with proposals and awards for specific grants, contracts, or other arrangements may properly be closed to the public under 5 U.S.C. § 552b(c) (4), (6), and (9) (B); those portions disclosure of which would risk the circumvention of a statute or agency regulation under 5 U.S.C. § 552b(c) (2); and those portions having to do with specific Office of the Inspector General investigations and enforcement actions may properly be closed to the public under 5 U.S.C. § 552b(c) (5), (7) and (10).

/Signed/

Lawrence Rudolph
General Counsel
National Science Foundation

Committee on Education and Human Resources**Workshop on Engineering Workforce Issues and Engineering Education:
What are the Linkages?**Purpose

An initial, single day NSB-sponsored workshop is proposed to focus on recent recommendations for changes in engineering education and implications for the engineering workforce. A foundation for workshop discussions will include the cross cutting issues in the recent National Academy of Engineering report, *The Engineer of 2020: Visions of Engineering in the New Century*, as well as the NSB reports that identified troublesome trends in the number of domestic engineering students, with potential impacts to U.S. preeminence in S&E based innovation and discovery. The major workshop objective is to move the national conversation on these issues forward in a productive way by calling attention to how engineering education must change in light of the changing workforce demographics and needs. The National Academy of Engineering (NAE), which sponsored the Engineer of 2020 study, has undertaken a Phase II study. The proposed NSB workshop would be in parallel to these NAE efforts. The NSB workshop would focus more substantially on the issues of the current and desired future engineering workforce in light of the Engineer of 2020 report.

Statutory basis

NATIONAL SCIENCE BOARD (42 U.S.C. Section 1863) SEC. 4 (j) (2) The Board shall render to the President for submission to the Congress reports on specific, individual policy matters related to science and engineering and education in science and engineering, as the Board, the President, or the Congress determines the need for such reports.

Link to National or NSF Policy Objective

It is widely recognized that our economy, national security, and indeed our everyday lives are increasingly dependent on scientific and technical innovation. Changes on a global scale are rapidly occurring for engineering, and Federal leadership is needed to respond quickly and informatively. The Board has issued several reports expressing concern about long-term trends that affect the U.S. workforce capabilities in engineering, including the dependence on international students and workers; the declining interest on the part of U.S. citizens in engineering studies and careers; weakness in the K-12 science, technology, engineering, and mathematics education system; and demographic trends that are unfavorable to increasing citizen participation rates in these fields. Engineers are the largest component of workers with college degrees in S&E occupations, with 39 percent of all S&E occupations in 1999. Almost half of S&Es in the labor force with bachelors' degrees as their highest-level degree are engineers. This field therefore has a huge impact on our national capabilities for S&T and deserves special attention.

There is a current high level of attention to engineering education from a variety of sources that converge to make engineering education an especially timely topic for the Board to address. These include the recent release of the National Academy of Engineering report, *The Engineer of 2020: Visions of Engineering in the New Century*, which calls for reform in engineering education; the National Science Board reports on unfavorable trends affecting long-term U.S. workforce capabilities in science and engineering and the need to address these trends along all points of the education pipeline; the concern of U.S. industry and the public sector in engineering capabilities in the workforce; and the poor progress in broadening participation in engineering.

Logistics

The NSB Office will be the focal point for providing all aspects of Board support in this NSB activity; coordinating NSF, other agencies and institutions involvement; and utilization of one or more NSB Office

contractual agreement(s) to assist with meeting logistics. NSB/EHR will recommend full Board approval of the appointment of an *ad hoc* Task Group of EHR to provide oversight for, and actively engage in, this activity.

An agenda and a comprehensive list of potential participants in the event will be developed with input from Board Members, NSF management, contacts in other agencies, and the broader S&T research and industry community. Invitees would include young recently graduated engineers, more experienced engineers, a range of employers (spanning the range of engineering disciplines), university thought leaders on engineering, and experts on engineering demographics.

Timing: Fall/Winter 2005

Workshop Topics: A workshop on the linkages between workforce issues and engineering education would involve a large range of topics, such as:

- 1) What are different scenarios for engineering workforce development in the U.S.? What are the differences among engineering fields?
- 2) How successful have we been in predicting the engineering workforce needs in the past and what has happened to the engineers when we got it wrong?
- 3) What are the implications of the different scenarios for engineering education?
- 4) What are the roles of the different stakeholders in the development of the engineering workforce, particularly the professional societies, universities, working engineers (of differing ages) and employers?
- 5) What is a typical demographic for an engineer today, and what will it become? How do we broaden participation?
- 6) The past and future role of international students and engineers in the U.S. engineering workforce.
- 7) The changing role of engineering education in preparing for engineering workforce needs for the future, including graduate education and lifelong learning as career shifts occur, and the idea that engineering education might be to prepare students more broadly for employment in the public, nonprofit, academic, and industry sectors.
- 8) How do we ensure that the best and the brightest students pursue engineering studies and careers, and that their education quality, content, and teaching are of the highest caliber?

Workshop Product: The final output from the meeting will be a concise set of Board approved recommendations that tie back to what universities (with employers) and NSF can affect, published in paper and electronic formats.

Audiences: In addition to the President, Congress, and NSF:

- Engineering deans/departments/schools
- ABET
- Engineering thought leaders
- Leaders in technical industry and the public sector that employ engineers.

National Science Board
“Vision for NSF Science and Engineering Research and Education”

Statutory Basis

“...the Board shall establish the policies of the Foundation, within the framework of applicable national policies as set forth by the President and the Congress.” [SEC. 4. (a)]

Action Requested by Congress

The Senate has requested the National Science Board to exercise their legislated authority and responsibility by developing and establishing a new vision for the National Science Foundation for the 21st Century. A succinct (12-15 pages) visionary document is requested to be finalized by the end of 2005 and include overarching goals with both long- and short-term priorities that take into account federal fiscal realities. This Senate request is complementary to Board discussion at the February 2005 Retreat.

Senator Bond, Appropriations Subcommittee, February 17, 2005

“Given the constrained funding environment, it is even more critical that the National Science Board develop a long-term vision for NSF.... This means articulating a vision for the future of science and technology, including the next bold cutting-edge areas of research.... The Board is ideally suited for this responsibility and I believe strongly that it is a core activity of the Board’s mission.”

Approach and Logistics

- NSB Chair will appoint an NSB *ad hoc* task group of three or four dedicated Board Members to focus on conceptualizing and drafting an initial document.
- NSB Chair, NSB Vice-Chair, NSB CSB chair and NSB Executive Committee chair all serve in an *ex officio* capacity on this *ad hoc* task group, participating and providing comments to the degree that they are able. Through the Executive Committee chair, NSF management will have continuous ability to provide comment as the vision document is developed.
- The task group will consult primarily with CSB as it develops a draft document for full Board discussion and approval. However, this activity will be considered an activity of the full Board.
- Starting point will be the 1998 *NSB Strategic Plan* and the 2003 *NSF Strategic Plan*. However, a new vision for the future of science and technology should be established as a bold statement on the cutting edges of research. Need to also articulate priorities and challenges, and how NSF will lead in meeting these challenges.
- A&O Committee will develop and provide *ad hoc* task group with a refined statement on the role and responsibility of the Board, building on the 1998 NSB Strategic Plan statement and follow-up from February 2005 NSB Retreat. CPP and EHR will provide input to the task group regarding long- and near-term NSF program priorities.
- Board Office staff will directly support the *ad hoc* task group effort, augmented by any of their contractor support that is needed.

Final document will contain –

- Long-term vision and goals for the 21st Century
- Clear statement of NSB role and responsibilities
- Characterization of the near-term federal budget environment and related constraints on federal investment in S&E research and education.
- 3, 5, and 10 year priorities, with 3 and 5 year priorities based on current budget realities
- 3, 5 and 10 year “workplan” for the NSB

Example of a Near-Term Action for the Board

“Working with the NSF Director, oversee a comprehensive re-examination of all NSF R&RA and EHR programs in terms of how they meet both the long and short term priorities, overall goals and vision set forth in the NSB “Vision for NSF Science and Engineering Research and Education.”

Milestones

- March 2005 – NSB Chair appoints *ad hoc* Task Group on Vision (Vision TG) and provides it with a general charge that full Board will discuss and refine.
- April 2005 – (half day meeting) Vision TG refines its general charge into a draft outline of the vision document with specific tasks assigned to Vision TG members and NSB Office staff.
- May 2005 – First rough draft of vision document woven together by NSB Office using Vision TG member input; sent to Vision TG and *ex officio*’s for comment.
- May 2005 – (half day meeting) Vision TG refines rough draft based on comments; send to CSB for review and comment at upcoming May 2005 meeting.
- May 2005 – (NSB meeting) CSB discusses rough draft.
- June 2005 – Rough draft revised with initial formatting similar to existing 1998 NSB Strategic Plan; NSB Office contractor who is expert on preparing vision documents is consulted.
- July 2005 – Clean draft document sent to Vision TG and *ex officio*’s for comment.
- July 2005 – (half day meeting) Vision TG refines draft based on comments.
- August 2005 – (NSB meeting) CSB discusses clean draft vision document.
- September 2005 –(half day meeting) Vision TG makes final revisions to draft and document if put into final format.
- September 2005 – (NSB meeting) CSB discusses and make recommendation to full Board that draft vision document be released for public comment.
- November 2005 – (half day meeting) Vision TG makes final revisions based on public comment.
- December 2005 – (NSB meeting) Vision TG presents final document to CSB and the Board for final approval.